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The Lattimer Stevens Company
Columbus Ohio.

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"A STYLE AND SIZE FOR EVERY NEED"

NO matter what your requirements are in the gas cock line we can fill them.

In our most complete and modern line of gas cocks may be found gas cocks for ranges, gas cocks for hot plates, gas cocks for water heaters, and gas cocks for other gas appliances, big and little, tall and short, with stub-nosed nozzles and patent jets; some with porcelain handles, and some with black enamel; made of brass; made to suit U. G. I. specifications and also to comply with A. G. A. specifications; standard and special; all kinds, all styles, all sizes.

Acme
GAS COCKS

ACME BRASS WORKS

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AMERICAN
GAS JOURNAL

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Sweetening Sour Employees

A few thoughts of pertinence to all gas men

John F. Weedon

THE good fortune of our friends is the cause of most of our discontent.

That sounds somewhat cynical but if you will consider it awhile you will find it contains a larger percentage of truth than most proverbs. Nor does it apply only to one class of society or one period of time. You will find it in "Holy Writ"—as witness the Prodigal Son's big brother, or the laborer who received in full the wages agreed upon, and then put up a howl because the fellows who worked only half time received the same amount.

The Story of the Good Saint

There is also the old legend of the good Saint who, to keep his soul and body free and unspotted from the world, set up his hermitage in the center of the desert. A tribe of little devils came to tempt him. They showed him miraculous mirages of marble palaces; soft and seductive music was sounded in his ears; entrancing females danced before his eyes, and odors of savory bakemeats assailed his nostrils. But the good Saint never so much as heaved a sigh or batted an eyelash.

The little devils gave up in disgust and took their departure, but on their way they met Satan himself strolling over the Sahara, and told him of their disappointment and failure. "You used the wrong methods," said he; "watch me."

Walking over to the Saint, he whispered in his ear: "Good morning. A wonderful morning, isn't it? And I have some wonderfully good news for you. Your old friend, the Abbot of Blank, has just been made an Archbishop."

John F. Weedon

Whereupon the Saint frothed at the mouth, tore up his good books, stamped and spat upon the ground and in general acted in a manner entirely unbecoming a holy man.

The Inferiority Complex

The matter with the Saint was that he was suddenly seized with what a modern psycho-analyst would describe as an "inferiority complex." The world is full of people who have "inferiority complexes," and they are particularly prevalent in the personnel of large corporations and big business institutions.

This form of mental malady is developed from a sense of injustice. Somebody with lesser "capabilities, fewer years of service and fewer claims to consideration, has been promoted over their head, or is receiving a higher salary than they are. An outspoken protest, or evident animosity to the change, is impolitic. Therefore, it is acknowledged with a nod and a cold smile; but the seeds of sourness begin to curdle the milk of human kindness. The individual thinks he has had a "raw" deal. He begins silently to ponder ways and means to "get even."

"Getting Even With the World"

Modern society is full of such individuals, many of them seeking to "get even" with the world at large. Their methods of doing so are devious and depend upon the quality of the individual; but they

almost always work silently and secretly. A secret revenge seems to be the palladium of these people; and it may take the form of any kind of injury, from petty annoyance to wholesale destruction.

In its more aggravated form it amounts to a regular mania, and is comparatively rare, but in its lesser manifestations it is as common as colds in February and can be found everywhere. For the present, however, we are only concerned with its actions and reactions in a public utility organization.

A certain amount of injustice and inequality is inseparable from the operation of all human organizations. Much of it is real, some is more apparent than real, and some of it exists only in the minds of certain people, who, with or without cause, are literally soaked in self pity all the way from the cradle to the grave. This class is, of course, hopeless. Neither kindness nor any other treatment can cure them. They are probably a manifestation of some sort of atavism. In some previous incarnation they were probably booted from behind by their feudal lord—and they are still sore about it. They are too nearly psychopathic cases to be within the help of any ordinary office manager or company official.

Many Feel Neglected

But, on the other hand, there are, and must be, many worthy, worth-while employees who have, or think they have, just cause for feeling they have been deliberately overlooked or neglected, in the matter of promotion or increased remuneration. They feel they have suffered the "spurns that patient merit from the unworthy take" (that ailment evidently antedates Shakespeare) and their "patient merit" ferments and turns sour, if some explanation, consideration or appreciation is not shown them.

Nepotism and favoritism in office appointments is much less prevalent than it used to be, say, twenty-five or thirty years ago. You will find fewer of the big men's poor relations on the payroll than there used to be, and where you do find them you will generally find also that their qualifications justify them in occupying the positions they fill.

Secretaries and superintendents are expected to know what is required of them and to be competent to do their work. More and more you will find that such positions are filled by men who have worked their way steadily upward through the organization and have achieved their positions solely on their merits.

Too Good for the Job

Nevertheless, every man erects a hazard for himself when he develops too much efficiency in any one particular line. He gets too good to be taken off the job and the man with less merit is preferred to him.

It can be argued that a man who develops "efficiency plus" in any one position in life, will, if given the opportunity, apply the same qualities and become equally efficient at some new line of work. This theory does not work out in practice. A man may be a most excellent bookkeeper and turn out to be an absolute failure as a superintendent of bookkeepers. Probably the old adage applies: "Those who can, do; those who cannot, teach."

Before the era of department stores, when they were still largely linen drapers and dry goods merchants," an ability to serve behind the counter demanded an apprenticeship and knowledge of the business; floorwalkers were chosen for their personality and appearance. A real knowledge of the merchandising end of the business was in the nature of a disqualification to anyone applying for the position of "floorwalker." Yet the floorwalker, to a considerable extent, bossed the boys behind the counter. No salesman, however, excellent as he might be, could aspire to become a floorwalker, and in those days floorwalkers were paid more money than salesmen.

The Matter of Promotion

Promotions are not made, and never can be made, solely on merit, if by merit we understand a record of having performed faithfully and efficiently and in a better, or at least equally satisfactory manner, the work allotted, this to be coupled with priority in the matter of period of service, and suitability in the matter of health, temperament, age and habits. A man may have all these qualifications and yet, for a good and sufficient reason, be passed over for someone whose record in the above respects gives him less right to be considered first.

Consider the Fellow Who Did Not Get Promoted

It has always been customary to congratulate the fellow who got the bigger job, or the larger salary. Let us have something to say in the future to the good fellow who didn't get either. If he wants to, and can point out some inequality of recognition, discuss the matter with him frankly and freely, without prejudice. Maybe he is right; maybe he overlooked a few things himself which you can point out to him.

It may not be business ethics to discuss salaries paid to various people; but that information is an open secret in most organizations. Where two men are doing the same class of work and you pay one $215 a month and the other $250, they will love each other like a couple of strange bulldogs, to the detriment of your business, and one of them at least will hate you. If you have a reason for knicking one of them for the extra thirty-five per, do not keep him in the dark about it. If you give him no reason, he will manufacture one for himself that will put him still further in the wrong direction.

Keep Employees "Sweet"

The way to keep employees from getting "sour" is to keep them "sweet." And the way to do that is to pay each and every one of them (pardon the tautology) some periodical and personal attention and encourage them to be perfectly frank in expressing

"Stick close to your desks and never go to sea, and you'll all be made rulers of the Queen's Navy"—is merely comic opera philosophy. I can't be done; and every sane and reasonable man knows it can't be done.

(Continued on page 1312)

The Production of Gas in the Generator

A study of conditions controlling its operation

Ernest Terres and Julius Schierenbeck

(The article that follows has been translated from the German version, which was published in the German gas journal, Das Gas und Wasserfach. The article describes certain experimental work and the results that were obtained therein in the attempt to explain the mechanism of the gas process as it takes place in the gas generator. In this particular case reference is had to a generator or a producer that is fired with coke. The various researches that have been made on this matter by different investigators have been rather numerous, but in a great many plants it has, nevertheless, been customary to work along empirical lines. The investigation which this article describes was instituted for the purpose of obtaining accurate information which would do away with the empirical method of operating the apparatus. It was particularly concerned with the three factors, the height of the bed of fuel in the generator and the influence that it has on the draft of air passing through it, the importance of free grate area and the relation between the production of the apparatus and the cross-sectional area of the same. The tests were carried out on a large scale and interesting results were obtained. The article is worth while reading and is recommended to the gas man.—Trans.)

Introduction

(In the original German a considerable space is devoted at this point to a description of the progress made from earliest times along the lines of heating coal gas furnaces in a gas works with gaseous fuel made in a producer, either as a straight producer gas or as a mixed producer and water gas. Particular reference is made to the work done by Dr. Bunte along these lines.—Trans.)

One of the important matters connected with the manufacture of gas in producers or generators is the yield of the apparatus at different air pressures and through the use of various kinds of coke commonly employed for this purpose.

The results of these experiments determined the average composition of the gas as it left the producer, the consumption of coke with different air pressures in the air blast, the quantity of blue gas produced at different pressures and the formation and the removal of the clinker and ash. Space is wanting to describe the various researches that were made along these lines and which are of great importance in this connection. But it may be said that it was not possible to obtain an accurate idea of the operation of the apparatus from the results of these experiments.

Results Obtained by Bunte

The results that have been obtained by Dr. Bunte in this connection are given below:

1. He first found that the consumption of coke and therewith the production of gas in the apparatus rose regularly or quite regularly as the pressure of the air blast increased, and that different types of coke, when used in the same thickness of beds, required different air blast pressures to accomplish the same results.
2. As the air pressure increased, the percentage of carbon dioxide in the gas increased likewise and similarly the temperature of the gas as it left the generator rose.
3. A layer of coke about 750 centimeters thick was sufficient for all cases.
4. The clinker had a greater effect on the fire brick lining of the apparatus, the less viscous it was in the molten condition.
5. The use of steam can prevent the action of the liquid clinker on the fire brick lining and in fact can prevent the melting of the clinker and at the same time a more valuable mixed gas, containing a certain proportion of water gas, was obtained.

Further investigations made by other experimenters revealed the percentage composition of the gases that were obtained in the different layers of fuel in the producers.

Purpose of the Experiments

The investigations, which are hereafter described in this article, were instituted with the prime purpose of acquiring a fund of accurate data on the operation of the apparatus so that it might be possible to operate these gas machines in a scientific, rational manner, instead of in the usual empirical fashion, as is common at the present time. Furthermore, it was also desirous to find the effects of changes in the design and construction of the apparatus on the gas-making process. Hence the investigation was carried out along the following three lines:

Three Lines of Work

1. What depth of fuel layer in the producer is the maximum and the minimum that can be used, and what effect has the air blast pressure and the formation of clinker on this factor?
2. What is the importance of free grate area?
3. What is the relation between the production of gas from the apparatus and the cross-sectional area of the same?

There is no question but that all these questions are of great importance to the gas man and also

to the builder of the apparatus. It affects the height at which the gas outlet is located, for example. The relation between the free grate area to the total grate area is also of significance. Many other features of the design of the apparatus are also dependent on the results that have been ob-

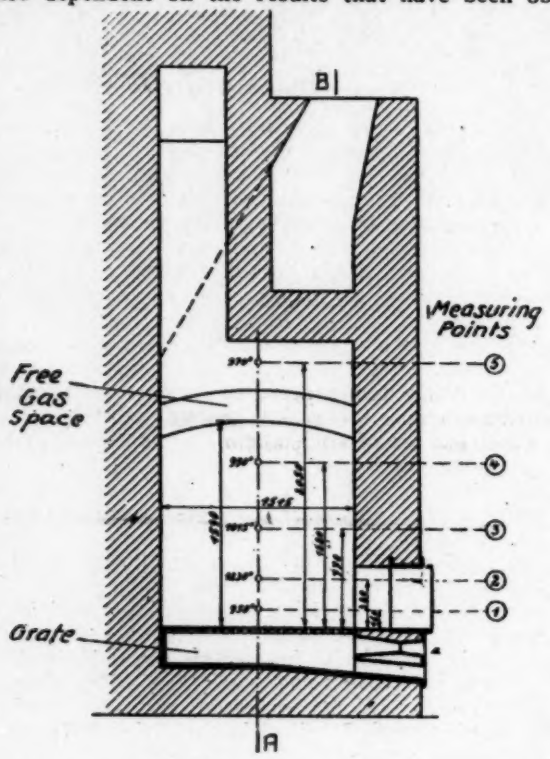


Fig. 1.

Flat Grate Producer

tained in this investigation. It may be said right at the start that the depth of the fuel bed of 750 centimeters, as established by Dr. Bunte to be best suited for all purposes, has been found to be correct.

The experiments were carried out in two producers of commercial size which were being operated in a gas works.

Description of the Producer

The first of the two producers possessed a flat grate. It is seen in cross-section in figures 1 and 2. The grate is seen to be composed of five separate parts. The steam that is fed into the apparatus enters through a special inlet shown at a and at the same time air is sucked into the apparatus to burn the fuel. The separation of the grate into five separate parts or chambers makes it possible to obtain uniform distribution of the mixture of steam and air over the entire grate area. After deduction of the two end sections, which are filled in as shown in the figure, the total free grate area is found to be 0.148 square meter and the total grate area is 0.833 square meter. The ratio between the two is therefore 1 to 0.178.

Up to a height of one meter the cross-sectional area of the producer is 1.74 square meters. From that point on the shaft becomes wider, due to the part that is built into the middle of the apparatus and affords an outlet for the gas. The gas outlet starts at a height of 1.60 meters above the grate and then extends through the entire height of the apparatus.

The coke-charging shaft is built up to a height of 4.10 meters. A funnel arrangement is employed for filling the coke into the apparatus. This is provided with two flap valves, so that no gas can escape while filling the apparatus with the fuel. The clinker was removed from the apparatus once every 48 hours during the progress of the experiments. This was accomplished by using an auxiliary grate, which was located at a point 1.28 meters above the regular grate.

The various layers of fuel in the apparatus which were subjected to investigation were those located at 0.16, 0.38, 0.77, 1.28 and 2.05 meters above the

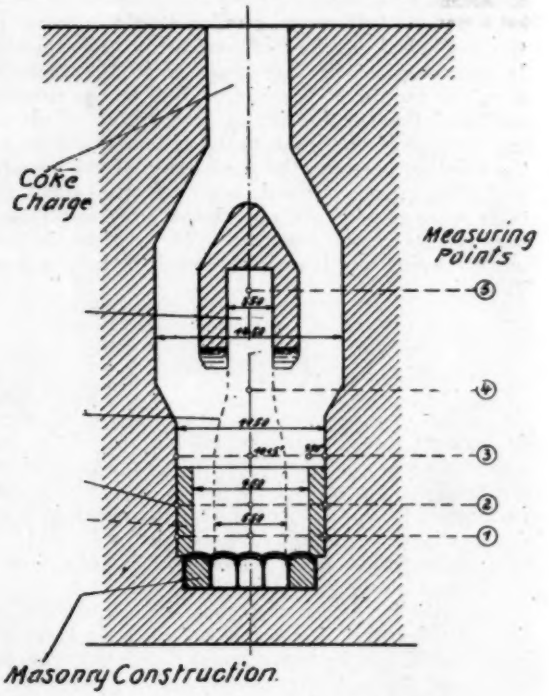


Fig. 2

grates. The topmost layer was, therefore, just in the gas outlet.

The Inclined Grate Producer

The second producer possessed an inclined grate. This is seen in figure 3. The grate was built from

(Continued on page 1297)

GAS MERCHANDISING

Domestic – Industrial

An Undeveloped Lighting Opportunity

The use of gas as emergency illumination

J. E. Bullard

ONE Saturday night, while the store was crowded, the lights of a fur establishment suddenly went out. When a new fuse was put into the circuit, and the lights relighted, it was found that some $1,400 worth of merchandise was missing. The owner of that store immediately became an excellent prospect for emergency gas lighting. He was, in fact, ready to buy a first-class gas lighting installation, if approached by a gas lighting salesman while the loss was fresh in his mind.

Jewelry stores, fur stores, all stores selling goods of such a nature that a thief or a burglar can easily carry away several hundred or several thousan dollars worth of goods, if they can get their hand on them, are careful about their vaults and their burglar alarm systems. They are not always s careful about their lighting systems, which mean that it may be much easier to rob them during the hours they are open than it is when they are closed If something happens to the lighting system, or something can be made to happen to it after dark, robbery is made comparatively easy and compara tively safe.

Danger of Relying on One Source of Supply

It is rather obvious that no store and no bank that keeps open during the evening is sufficientl safe-guarded when it relies solely on one source of light. Two or more sources are necessary.

With the lighting fixtures now on the market it i possible to light a store or bank with fixtures whic look exactly alike, but part of which are gas and part electricity. It is highly improbable that b gas and electricity will fail at the same time, and if there is a sufficient number of gas lights burning to give fair illumination, the store will be safe-guarded if the electric lights go out. The same holds true in case the gas lights go out, which may happen only under very extraordinary conditions.

If all electric light switches and all gas cocks are locked, the store is still further safeguarded. There is less chance of anyone turning out both lighting systems. The conditions which cause a failure of the electric supply anywhere between the central station and the store are rarely the same conditions which can cause a failure of the gas supply anywhere between the gas plant and the store.

Importance of Emergency Gas Lighting

This means that emergency gas lighting in the form of a number of lights scattered throughout the store and always kept burning, when the other lights have to be turned on, serves as an effective safeguard from loss through theft because of th failure of the lighting system. The city of Providence, R. I., has an ordinance requiring all theaters to keep burning at all times that the theaters are open to the public enough gas lights to make exit from the theaters safe in case the electric lights fail. The City Council of that city recognized the danger to life of permitting the theaters to depend upon a single source of light. Though the ordinance does permit the use of emergency lighting other than gas, the requirements are such that gas lighting proves the only practical lighting for emergency.

Though loss of life may not result in a store due to the failure of the single source of light used, loss of property does result whenever that light source fails. Emergency gas lighting proves the most practical and the cheapest insurance against such failure.

Gas Lighting Not Over

It is folly to believe that the day of gas lighting is waning. There is a real need for it. There is a demand that sooner or later must be met. One of these demands is emergency lighting, the kind of lighting that makes streets safe at night, theaters safe when filled with people, stores and banks safe against being suddenly plunged into darkness at night and the loss of property almost certain to result from such an occurrence.

To meet this demand it is necessary not only to supply gas, but to supply fixtures that match or harmonize with the electric fixtures. The size of the lighting units must be right and the mainte-

nance problem solved. Since this emergency lighting is so very important, there is no reason why the business cannot be handled at a profit. It is not a matter of selling gas lighting at a lower cost than electric lighting, but rather of selling lighting insurance. When once shown the importance of this insurance, people will pay what it is worth. This is pretty well demonstrated by the high rates now being paid in many states for liability insurance by automobile owners.

Olin W. Hill, director of the investment department of the Babson Statistical Association, in a talk before the Gas Sales Association of New England, cited the instance of a candle company paying 8 per cent dividends on $1,600,000 preferred stock and 10 per cent on the equivalent of $1,000,000 common. The company is able to do this because it makes decorative candelabra, fixtures and shades which create the demand for the candles. In other words, the candle company is not merely making tallow dips; it is making artistic fixtures and a wide range of candle sizes. It is making its product appeal to the aesthetic side of the individual, as well as to the practical. As a matter of fact, the sale of candles for purely practical purposes is very limited, but, when art is added, there appear to be no limit to the possible market.

Gas Has Not Lost Its Practical Lighting Value

We have a long, long way to go before gas lighting ceases to have a real practical value and will have to be sold on its artistic value. Unless some entirely new method of producing light is discovered, gas lighting will never lose its practical value.

In many instances, the falling off in the use of gas for lighting purposes has been due more to neglect on the part of gas men than to any limitations in the light itself. When laws are passed which virtually require light users to use some gas lighting, it is evident that gas lighting still possesses a value not possessed by any other form of light.

Great Dependability of Gas

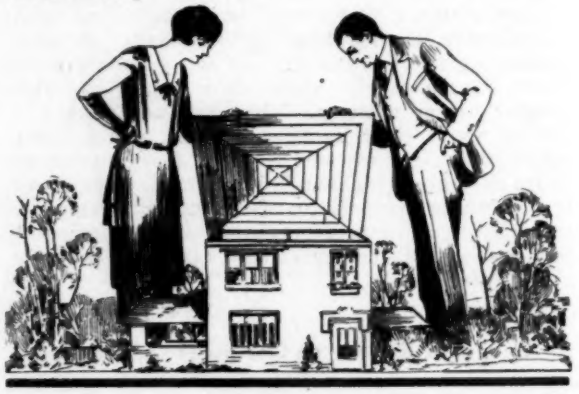
Gas lighting is of value for emergency lighting on account of its great dependability. Gas companies have operated in this country for a hundred years or more without a single serious failure of the supply. Gas is supplied through metal pipes that are not easy to cut. If they are cut, the escaping gas immediately gives warning of the fact. Gas cocks may be locked securely in either the open or the closed position. If the gas is flowing in the street mains, the only thing that will cause a failure of supply in the building is the closing of some cock. It is far from an easy matter under any conditions, provided suitable precautions have been taken, for a person to throw a gas lighted room into darkness without first attracting the attention of a number of people in that room.

Since the days of the candle, the oil lamp and the open gas flame the intensity of light used has increased many fold; the population of the country has also greatly increased. The sale of no more gas lighting than is needed for the safety of life and property would materially increase the sale of gas. Looking at the proposition merely from a safety point of view, we find a tremendous field that has scarcely been touched.

Lights in Office Buildings

Every office building should have gas lights in every corridor and every stairway, and these lights should be burned during all the hours of darkness when the building is unoccupied. All hotels should be similarly equipped. Theaters should have gas lights at all exits and in all passages used for exit purposes in cases of emergency. All stores and all banks, open after dark, should have a lighting installation in which there are a sufficient number of gas units to make vision clear in case the other lights go out for any reason. Mills and factories, not using gas lighting exclusively, should have a carefully planned gas lighting equipment which is used during hours of darkness and gives sufficient light to guide the employees out of the building in case the regular lighting system fails.

In other words, in every place where being plunged into sudden darkness endangers life or property, there is a real need for gas lighting that is always in good working order. Using gas in these places is merely a matter of common sense and safety first. During the past years there has been a great deal of work done toward preventing accidents. The gas men who endeavor to sell gas lighting for emergency purposes are merely carrying on this safety work.



"If it's done with Heat —you can do it Better with GAS"

What's Inside?

Large rooms, pretty rugs, expensive furnishings—everything in taste and right up to date.

"A beautiful home," you say. "I wish it were mine."

But do you?

Not unless you were sure it was fully piped for gas service.

Putting first things first, it is conveniences that make homes livable.

One such convenience is gas service.

No home can be a modern without it.

(Your Name and Address Here)

A.G.A.-380

An Idea for a Gas Ad.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 50

Change of State *(continued)*

The More Specific Form of Formula

In order better to define k, another factor is introduced into the equation, and that is the mass or weight of the body. The equation will now read as follows: $H = K \times M (t_2 - t_1)$. M is the mass of the body either in grams or pounds, as the case may be.

Then K is the coefficient of heat capacity, or when based on a similar coefficient for water it may be designated as the specific heat of the body. When this is done, that is, when the coefficient K is expressed in comparative terms based on the coefficient for water, which as is known is unity, then the value of H will be in calories or British thermal units, in accordance with the system of mensuration employed. It is important to bear this in mind, namely, that the reason why the term specific heat is employed in making heat calculations is because the heat unit, the calorie and the British thermal unit, is based on water.

It will be remembered that the British thermal unit is defined as the amount of heat required to raise the temperature of a pound of water one degree Fahrenheit, from 60 to 61 degrees F. In other words, this indicates, therefore, that if a substance has a specific heat of 0.5 when the specific heat of water is unity, half a British thermal unit will raise the temperature of one pound of that substance one degree Fahrenheit. This is the real significance of specific heat. If that characteristic of a substance is known, it is an easy matter to calculate the amount of heat that will be required to effect a certain temperature change in the body, provided, of course, the weight of the same is also known.

Constancy of Specific Heat

It has been said that specific heat is a constant. Each substance has its own specific heat. This is true within certain limits. Thus, it has been pointed out above that the specific heat of water varies with the temperature, although the variation is so small that it is not given any consideration in practical work. This, of course, means that the heat unit, the calorie or the British thermal unit, varies as well.

Another variation in the specific heat of a metal is caused by mechanical treatment of the metal. Thus, the specific heat of rolled copper is different from that of soft copper. The specific heat also differs according to the allotropic modification of the substance. Thus, the diamond, charcoal and graphite are all fundamentally carbon, but each has its own specific heat.

The table of specific heats, which is given below, is used by engineers in calculating the heat that is required to bring a certain substance up to a certain temperature. Such calculations are common and the principles on which they are based have been discussed in detail above. The second of the two heat capacity equations is used for this purpose.

LIFT YOUR LIMITS

Sometimes a man gets to thinking in too small figures and so reduces his chance of accomplishing something big, of building a big business.

If we rate the maximum figure of business possible for us at a small figure, we shall not lift the business to a large sum.

Columbus received $320 for the discovery of America. That might lead a man to think America a cheap country if he were to confine all his estimates to figures based on that sum.

On the other hand, here is a country that imports 155,000 canaries annually. Its largest city spends half a million dollars a year for violets alone. Such figures show something of the boundless possibilities of business in the United States.

If a man will investigate some of the figures of such minor items of every-day life, he will awaken to a realization of the fact that there is a chance somewhere for him to build a business that shall tower far above his first imaginings.

The man who does not investigate the possibilities of business in his line, who simply takes it for granted that with moderate effort he will get the maximum possible business, is going to remain one of the little fellows in his line.

Lift your limit to the skies and go after all the business there is. Because nobody has ever built a big business in your line is no indication that no one ever will. It is no sign that you yourself may not do it.

Because there is in your home town no great business does not mean that a great business may not be built there. There are plenty of instances where little villages have harbored men who were able to make business come to them until they were bigger than their community.

From the Ore Fields to the Finished Product *

Gas does the most important work

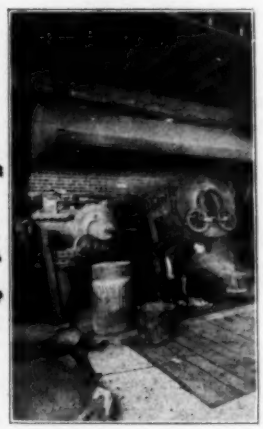
C. H. Martin

Industrial Gas Sales Engineer

One of the basic industries, the production of iron and steel, ramifies through the fabric of business in the United States more widely than almost any other. This great industry employs 1,585,712 wage earners, has a capital investment of over eight billion dollars and turns out nearly ten billion dollars worth of products annually. Without gas the industry would undoubtedly be at a standstill. Practically no raw coal is used in the manufacture of iron and steel. All through the thousands of processes in the making and shaping of iron and steel products gas plays an important part. Our Mr. C. H. Martin has made a study of this industry over a period of many years. His story is crammed full of interesting facts and well points out the immensity of the industrial gas business.

Mining Ore in the Lake Superior Region

Typical Blast Furnace in the Calumet District



Gas-Fired Steel Hardening Furnaces

IN the fall of 1844 a surveyor tramping over the wilds of the Lake Superior region accidentally stumbled over a rip of sod and discovered an ore rich with iron. Little did he realize that this great region would soon have an annual production of more than sixty million tone of ore, or over 86 per cent of all mined in the United States! Just think: The annual value of the iron and steel products sold in the United States is nearly ten billion dollars.

*From the Peoples Gas Club News.

Thought It Insignificant

This incident bore no significance to William A. Burt, for he failed to make any note of the location of his find. Two years later a party from Jackson, Michigan, discovered a deposit in the same region. They carried a little of the ore back to Jackson and smelted it. Thus the first iron ore from the Lake Superior region was smelted in Jackson, Michigan, and used in the "walking-beam" of the old lake steamer "Ocean."

Transportation

At first the ore was hauled overland in sleighs. In summer the business was abandoned. Roads were impassable. Later on shipment of the ore via boat was introduced. At first little vessels were used. They were much like corks upon the ocean. It took many days to load and unload them. Weeks and sometimes months were required for these little craft to negotiate the 1,000 or more miles from Duluth to Chicago and return.

A Chain of Ore Boats

Today we have the gigantic steel ore boats 600 feet in length. They carry 12,000 tons of ore. It takes but 25 minutes to load a modern ore boat and

(Continued on page 1301)

As The Journal Views It

A MERRY CHRISTMAS TO ALL

Christmas time is now at hand. Its spirit pervades the very air we breathe. Its influence is with us in our work, our thoughts and our aspirations. This is the time of the year that everyone is imbued with cordial, kindly feelings towards his fellow men, more so than at any other time.

It is with a great deal of pleasure that The American Gas Journal takes this opportunity to extend to all its numerous friends in all the various branches of the gas industry, to its advertisers, its subscribers, its contributors, to all the gas fraternity, its best wishes for a Merry Christmas.

THE GAS COMPANY HOLDS OPEN HOUSE

The attention of gas men was recently called, in the columns of The American Gas Journal, to an interesting project that was undertaken by the gas companies, and other utility concerns, in the state of Michigan. During a certain week the public was particularly invited to visit the gas works and see for themselves how gas was made. This week was called "Open House Week." Considerable publicity was given to the matter, and the returns which have now been collected indicate that the idea was an entire success.

There is no question but that such an undertaking is of the greatest importance in the promotion of better public understanding. Some utility executives may have felt that the public was not interested in how the utilities operate, and they perhaps received the surprise of their lives when they saw the numbers of people that visited their plants. There is no doubt but that there exists among all people a wholesome desire to see new things and to learn something new all the time.

The results that were obtained during the Michigan Public Utility Open House Week seem to indicate that the public is willing to sacrifice its leisure, which might have been spent in golfing or other amusements, to visit the gas works and other utility plants, to see for itself how gas is made.

The importance of this matter to the gas industry is really far reaching. The average person knows so little about gas, and what he does know is generally so inaccurate, that when he visits the plant and is confronted with the magnitude of machinery and equipment that are required to make, purify and distribute this fuel he is profoundly surprised. He returns from his visit imbued with a far greater respect for the gas company than before he entered the gas works. If the tour is properly conducted he is bound to obtain an impression concerning gas manufacture and the gas company which will go far towards removing erroneous preconceived ideas which he might have had on this subject.

The gas company is accordingly given an opportunity to show the average man and woman who visits the gas works what a stupendous task it is, after all, to provide the customer with gas at all times of the day and night. It is given an opportunity to impress this fact upon the visiting customer, not by words, but simply by letting him see for himself what the gas company has to have on hand in order to supply him with gas, and what it has to do in order that there should be a never-failing response when at any time during the day or night he opens the gas cock.

There is no doubt but that the public appreciates very little the vicissitudes of gas making, and has a rather erroneous and very hazy conception of what a gas works consists of. This is not strange, for in general the average man is very poorly informed about technical matters, or manufacturing processes that are of a more or less technical character. Therefore, when he is given an opportunity to correct these ideas the results are bound to be very significant. He will go away from the gas works with a feeling in mind that, after all, gas making is a complicated process and not at all what he imagined it was. He will certainly be imbued with a far greater respect for the undertaking of gas making, for the courage, far-sightedness and energy that are represented in a gas plant.

Another phase of this Open House Week was the

effect it had on the employees. This was very marked. Generally, the men who work in the gas works have had the feeling that no one cares about what they are doing outside of their own executives, and that the public itself was absolutely uninterested in their affairs. But this feeling was entirely changed when they saw the large numbers of people coming into the works, filled with enthusiasm and interest and ready to ask many questions. That it had a beneficial effect on them there is no gainsaying, for any one will work better when he realizes that people are interested in what he is doing, and that the health and comfort of a large community depends primarily on how well he carries out his duties.

All in all, it must be said that the idea of holding Open House Week for Utilities is splendid, and the results have more than substantiated any claims that were originally made for it. It should be practiced by gas companies all over the country. It cannot but redound to the benefit of the gas company and the other utilities who are progressive enough to see in the Open House Week plan a potent element tending toward the promotion of better public understanding and the creation of a stronger feeling of good will between the public utility and the community that it serves.

SANTA BAKES MANY TOYS IN GAS OVEN

The lion, the leopard, the sheep and the shepherd, the bob-tailed grizzly bear, to say nothing of Jack-the-Giant-Killer and little Red-Riding-Hood, are all getting ready for Christmas. Coats of paint and bright eyes, fur and feathers and silk, are the finishing touches now being given to tens of thousands of toys. The most lifelike of these, the lightest to lift and the hardest to break, are the toys moulded in papier-maché which emerge in their first form from a gas-fired oven differing chiefly in size from the oven that cooks the Christmas dinner.

The first step in the toy-making process is the modelling of the mold. This is made of plaster of paris in the form of a hollow cast and hardened. Into the cast trained girl workers fit layer upon layer of prepared paper, or papier maché, made of pulped paper mixed with resin and other substances. When eight or more layers have been fitted and smoothed into the mold, the whole is put into the big gas-fired toy oven, the heat of which is automatically held to the required temperature. The baking is a matter of hours, depending upon the size of the toy and the thickness of the shell. When the layers of papier maché have been thoroughly welded into a firm unit, the plaster cast is removed and the body of Red Riding Hood, or Jack, or the elephant, goes to the finisher. This artist glues on the hair and paints the tiger's stripes or Red-Riding-Hood's rosy cheeks, after which she goes to the dressmaker, who gives her a bright red cape that must exactly match the color of Christmas holly.

A ONE-DAY SALE

William H. Matlack

The first one-day sale that we have ever heard of in the gas business was recently conducted by the Gas Light Company of Augusta, Georgia. Department stores have long been employing one-day special sales to build up valleys in their weekly sales curve, but this is the first time such a sale has ever been staged by a gas company. The company ran a teaser ad. in their regular newspaper space on Friday, and on Sunday ran the announcement reproduced here in one of the Sunday papers, with the result that an order was 'phoned to the company's office for a heater at 8:30 p. m. Sunday, and on Monday orders were again received by 'phone and by letter, and one customer sent in the down payment with a note saying that he was called out of the city, but in order to be sure to get in on the sales he was "sending the down payment, and will call and sign the contract when I return on Tuesday." In all, the sale was a success, as by Tuesday night the company had disposed of a dozen water heaters which, coming as it did, on top of the best selling season the company had ever had on water heaters.

THE GAS LIGHT COMPANY
OF AUGUSTA
ONE DAY SALE
Monday, Nov. 10th.
TOMORROW, MONDAY, NOVEMBER 10TH
For one day only we will place the famous No. 25 RUUD GAS WATER HEATER on sale at the very low price of
$20.00 Connected, Ready to Use
Only 50 in this lot—Act at once. 'Phone your order or come to our store.
Provide Your Home With
Hot Water Service
GAS SERVICE
"THE SERVANT THAT NEVER QUITS"

Catechism of Central Station Gas Engineering in the United States

Installment No. 50.

(Continued from last week)

Thus one form of globe, used for lighting a desk or table by means of lights on a chandelier above it, is so made as to direct the larger proportion of the light downwards; another, used for the general illumination of rooms by means of lights on the chandeliers, distributes the light uniformly in the hemisphere below the horizontal plane passing through the light source, while still another form, used for street lighting, causes most of the light to be given off in the space between this horizontal plane and the cone generated by the revolution of a line drawn through the light source at an angle of 45 deg. with the plane.

Each style requires special forms for the prisms on the exterior surface, and it is also necessary that the forms of these prisms on any one globe vary with their position relative to the source of light, since the rays of light cannot be refracted in parallel directions by prisms of the same shape, when one receives horizontal rays and the other rays at an angle of, say, 45 deg. with the horizontal.

Advantages of Holophane Globes

The use of Holophane globes is especially advisable with incandescent gas lights for two reasons. In the first place the intensity of the light is too great to permit of its being used unshaded for ordinary interior lighting. The diffusion effected by the Holophane globe overcomes this objection with the least possible loss of light, since, owing to their design, these globes absorb very little more light than is absorbed by plain glass, while an opal or tinted globe sufficiently dense to cut off the direct view of the light source will absorb a large proportion of the total light emitted by the source. In the second place, the light emitted by a naked incandescent light is, owing to the shape of the mantle, given out principally in a horizontal direction, and so is not available, when, as is usually the case, the light is above the surface to be illuminated. By changing the direction of the rays the Holophane globe actually increases the amount of light made useful in cases of this kind, the absorption of the glass being more than counterbalanced by the extra rays drawn aside from the illumination of space where only a slight illumination is needed and made to take a more useful direction. The total spherical illumination, that is, the illumination of the whole space surrounding the light, is of course diminished by an amount equal to the light absorbed by the globe, the increase in the amount of light at the points where it is to be used being obtained at the expense of the amount at the points where it is not needed.

Forms of Atmospheric Burners

268. What are the different forms of atmospheric burners usually employed for the top burners of gas cooking stoves, and which form do you consider the best for this purpose? Give the reasons for your choice.

Ans. The different forms of atmospheric burners commonly employed for the top burners of gas cooking stoves may be classed as ring burners with drilled holes, radial or star burners with drilled holes, ring burners with slits sawed in them, and star burners with sawed slits. Annular slit ring burners and serrated disc, or cap burners, are also sometimes employed, but the drilled or sawed burners are the only ones used on the better class of stoves.

One series of careful experiments seems to show that given equally good design in other directions, as, for instance, in the form and size of the air mixers, the drilled ring burners possess the greatest efficiency, that is, enable the largest proportion of the total heat given by the gas consumed to be utilized in useful work. Next to the drilled ring burner comes the drilled radial burner, followed by the sawed ring and the sawed radial burners in the order named.

Tests on Burners

In the answer of one of the members of the class, who has made a number of tests of gas stove burners, ring and star burners are compared as follows:

"There are two general shapes of burners, the ring and the star. The efficiency of the one as compared to the other will run about the same, but the star burner offers the advantage over the ring in that it is possible to drill more ports on its surface and so a higher rate may be burned on it with good combustion.

"By this is meant that, taking a star burner and a ring burner, both of which are set 1¼ in. from the bottom of the vessel and burning 10 cubic feet per hour, it will be found that the efficiency will be about the same, but if the consumption is increased to 13 cubic feet per hour, it will be noted that the efficiency of the star burner will only drop about 2 per cent, while the ring burner would not do at all because of the poor combustion. To drop the burner to get proper combustion means to drop the efficiency.

"In this point lies the advantage of star over ring burners, with the one exception of a ring burner in

which there is a double row of ports and a ventilated space between the two rows.

"I prefer a cored cast star burner, 4½ in. in diameter, eight arms and forty-eight No. 40 gauge ports spaced 5-16 in. apart from center to center and with the ports around the center air well drilled at an angle of about 60 deg., the flame pointing in toward the center of the burner.

"This burner will give as high an efficiency as any other burner and will permit of a maximum rate per hour with good combustion and proper efficiency."

It is, however, undoubtedly true that the average ring burner gives a better efficiency than the average star burner because in the former there is a better supply of air to all parts of the flame, owing to the fact that the air is free to rise on the inside as well as the outside of the ring, while in the star burner, unless very well designed, the access of air to the gas issuing from the central portions of the burner is very much obstructed. The greater efficiency of the burners with drilled holes, as compared with those having the orifices in the form of slits, is probably due in part to the greater opportunity for free access of air to all parts of the several jets of flame that is given by the drilled form, and partly to the smaller ratio of perimeter to area of circular as compared with rectangular orifices, which affords a smaller contact between flame and burner and consequently a smaller abstraction of heat from the flame by the burner. It is an observed fact that in other forms of non-luminous burners the circular aperture gives much the best results, and this rule seems to apply as well to the atmospheric burners used for gas stoves.

Meter and Pipe Sizes for Gas Range

269. In setting a gas range which has an oven burner and four top burners, what size of pipe should be used, and to what size meter should it be connected? Give the reasons for your answer.

Ans. A gas range having four top burners and an oven burner should be connected to the meter by a ¾ in. pipe, if the range is not more than 50 ft. to 60 ft. from the meter, and by a 1 in. pipe if the distance is greater than this. The meter should not be smaller than 5-light.

A gas range of this description will consume, when all the burners are in use and burning full, at least 60 cubic feet of gas per hour. On a length of 50 ft. the passage of gas at this rate through ½ in. pipe would result in a loss of pressure of from 4-10 in. to 7-10 in., according to the specific gravity of the gas, the limits taken for the specific gravity being 0.400 and 0.700. Even the smallest loss is too large, and therefore ¾ in. pipe must be used. On a run of 60 ft., ¾ in. pipe will, at the above rate of consumption, cause a lot of pressure of 2-10 in., with gas having a specific gravity of 0.700, so for runs longer than this 1 in. pipe should be used, since, unless the pressure in the street mains is high, it is not advisable to lose even 2-10 in. pressure in the piping.

According to a table given in a paper entitled "The Measurement of Gas," read in 1897 by Mr. C. W. Hinman, before the New England Association of Gas Engineers, and published in the American Gas Light Journal, Vol. LXVI, page 401, a 3-light meter, passing 60 cubic feet of mixed coal and water gas per hour, causes a loss of pressure of 0.37 in. Mr. Hinman does not consider this loss too large, and concludes that a 3-light meter is large enough to supply a gas range if this is its sole duty. But a loss of this amount of pressure added to the loss suffered in the piping would, in most localities, make the pressure at the gas orifices of the range burners so low that it would be impossible to obtain a good atmospheric flame, and in practice it has been found best to use a 5-light meter with a range of this description, even when the meter supplies nothing but the range. It is even more necessary that nothing smaller than this size should be used when the meter has to supply the gas for lighting the house as well as that needed for the range. In fact, if the range is a large one, consuming, say, 80 to 100 cubic feet per hour, when all the burners are in use, a 10-light meter will be required to satisfactorily supply gas for both the range and the house lighting.

Testing Ranges

270. How would you test various samples of gas cooking stoves to determine which was most economical of gas and at the same time did the best cooking?

Ans. The comparative efficiency of the top burners of various samples of gas stoves may be tested by determining the length of time and amount of gas required to heat a definite quantity of water from a temperature of, say, 60 deg. F., to the boiling point. The same kettle should be used throughout the tests, and the weight of water employed, its temperature at the start, the exact time at which it begins to boil, and the amount of gas consumed, must be accurately determined in each case.

The efficiency of the ovens may be tested by determining the time and amount of gas required to bring each oven up to a baking heat and then to bake a definite weight of either bread or biscuit. The dough must be all ready to put into the oven as soon as the required heat is attained, so that no gas is wasted while waiting for the dough to be gotten ready, since any delay of this kind would spoil the tests. Each oven should also be tested for evenness of distribution of the heat throughout its whole interior. This can be done by placing pieces of white writing paper in different parts of the oven, and noticing the extent to which the different pieces are browned when the oven is hot enough to bake. The more nearly they all approach to the same color the more uniform is the distribution of heat throughout the oven, and the better it will bake. As a rule, the ovens that show a good efficiency by the baking test will also show a uniform distribution of the heat.

Circulating Gas Water Heaters

271. Give a description, illustrated with sketches, of one or more forms of circulating gas water heaters for use in connection with ordinary kitchen boilers.

Ans. One form of gas water heater for use in connection with a kitchen boiler is made in the shape of a cylinder about 10 inches outside diameter and about 30 inches long over all. This heater is suspended by the side of the boiler by means of the water connections. On some of these heaters the cold water pipe is extended down to the floor to give extra support and ease the strain on the water connections.

The cylindrical casing or jacket of this heater is made of cast iron, in two pieces, one half the front, or door, being hinged so that it will open for lighting, while the other, or back casting, is bolted fast to the top and bottom castings. This construction allows easy access for cleaning and inspecting, and prevents the danger of serious explosion due to improper lighting of the gas. Both of these jacket castings are lined with a cast iron shell, which fits closely to the jackets, and leaves about ¼ in. dead air space between the casting and this inner shell.

The Water Carrying Part

The internal or water carrying part of this heater is made of a series of cored, flat, circular brass or iron castings, screwed together by close nipples. These castings should preferably be of brass, as there is a tendency of the iron to rust and discolor the water. The water, entering through the center of the burner at the bottom by a ¾ in. pipe, is forced to circulate first to the outer edge of the section casting by a sheet baffle cast in the section, and then in over the top of the baffle to the upper nipple. This is repeated in every section of the heater, the water finally flowing out through a ¾ in. pipe at the top of the heater and so to the boiler.

The burner is an atmospheric star type burner, having the ports drilled in lugs cast on the top of the arms, and a central round hole through which passes the cold water inlet pipe. The mixing tube and air mixer are cast in one piece, which is fitted into the burner with a ground joint, and held in place by a set screw. The burner is capable of handling between 35 and 60 cubic feet of gas per hour.

The hot products pass from this burner over the bottom of the sections and up through the cast holes in each section to the next above. The water, being in a thin sheet between the bottom of the section and the baffle, becomes heated, thus causing circulation. The products of combustion finally find their way out through a flue collar in the back of the top casting.

Care must be taken to keep the flame from impinging on the lower section, since if it does the combustion of the gas is checked and rendered incomplete, and the gas will be wasted.

At present there are a large number of water heaters made with copper coils, instead of cast sections. These coils are set in the jacket in place of the cast section, but the cold water connection in this case is in the side of the casing, instead of in the bottom, the hot water outlet leaving at the top, as in the heater described.

Instantaneous Water Heaters

272. Give a description, illustrated by sketches, of some form of instantaneous gas water-heater.

Ans. The name "Instantaneous" is given to two classes of water-heaters in which the water is heated at the time it is needed. Heaters of this class do not furnish any heater water to be stored up for future use.

The first is what may be called the "Bath Instantaneous Heater," which does not deliver water at a sufficient head to enable it to be carried more than a few feet from the outlet of the heater itself. They work by causing the water that is to be heated to flow in thin streams over one surface of thin copper sheets, of comparatively large area, the other surface of these sheets being exposed to the heated products of the combustion of a comparatively large quantity of gas.

The heater illustrated on the accompanying cut consists of a copper cylinder, about 1 foot in diameter by 3 feet high, in which two spirally corrugated copper tubes are set, the bottoms of these tubes being a sufficient distance above the bottom of the outer cylinder to leave ample space for the gas burners, and also for a combustion chamber, above these burners, in which the combustion of the gas can be completed before the products strike the water-cooled surfaces of the tubes. The inner tube is provided with a closed bottom, but is open on top. The outer tube is fastened all around its bottom with a water-tight joint to the inside of the outer cylinder, and its top fits snugly against the vent opening at the top of the cylinder. The axis of each of the tubes and that of the cylinder all coincide, and the annular space between the tubes is about 1 in. wide.

Gas is supplied by means of a pipe, which should be ¾ in. in diameter. A pilot light is used to light the gas at the main burners, as shown. The lever of the main gas cock has on it an arm so arranged that as the gas cock is opened this arm opens the main water cock on the pipe. It is thus impossible to turn on the gas without turning on the water, and there is no danger of the heater being damaged by being exposed to excessive heat owing to the gas being turned on while the water is shut off. After passing the main cock the water goes through a regulating valve, by which the quantity flowing can be regulated to suit the requirements as to the temperature at which it is to be delivered. It is then carried, by a pipe inside the inner tube, up to the top of this tube. From the end of this main supply pipe branches are led to

deliver the water directly on the inner surface of the inner tube and the outer surface of the outer one. One of these branches is shown at H. The water flowing over the inner tube follows the corrugations to the bottom, where it flows through the pipe, J, into the bottom of the space between the outer tube and the cylinder, in which is also collected the water that has followed the corrugations of the outer tube. From this space it is delivered through one or more pipes, K, to the point, or points, where it is wanted.

Outlet for Products of Combustion

The only outlet for the products of combustion of the gas is up through the annular space between the corrugated tubes. This being narrow, the products are brought into close contact with the metal and rapidly impart to it their heat to be taken up by the water flowing over it. As the products and the water travel in opposite directions, the water as it is heated flows over surfaces that are more and more highly heated, and so is able to take up heat until it leaves the heater. The products of combustion, becoming cooler and cooler as they ascend, finally leave by the vent opening, which should always be connected to the outside air.

A gauge glass is provided to show the height at which the water stands in the space between the outer tube and the cylinder, and thus call attention to the necessity for checking the flow by the regulating valve should the water be running in faster than it can be carried off by the delivery pipes.

Heaters of the style shown on the cut contain 10 to 11 square feet of heating surface, will raise the temperature of the water by 50 deg. F. when it is flowing at the rate of from 1½ to 2 gallons per minute, and will consume about 1 cubic foot of gas for each 1 to 1½ gallons of water heated.

The water and the products of combustion do not come into contact with one another in such heaters, and the water heated by them can be used for cooking as well as for washing. Another style of heater is made in which the water and products of combustion do come into contact with each other, and such heaters can be used only for water that is not to be taken internally.

The Automatic Type

The second, usually called "Automatic Instantaneous Heater," is constructed of large copper coils heated by a set of individual Bunsen burners of large capacity. These heaters may be situated in the cellar and connected to the hot water supply of the house, thus heating water for use at any spigot in the house. The capacity of this type of heater is from two to eight gallons of water a minute, which is raised through a range of about 60 deg. F. The heaters are controlled by a water valve and thermostat turning on the gas to the burners, which are lit by a permanent pilot burner.

When the water is turned on at any spigot the pressure of the water in the hot water pipe is reduced and allows the excess pressure of water in the cold water pipe to open the gas valve, which is usually kept closed by a spring. The opening of this water valve turns on the gas to the main burners.

The amount of gas fed to the burners is regulated by the thermostat, which keeps the water discharged at a given temperature; turning on more gas, when the water falls below this temperature and cutting down the gas when the temperature gets too high. The efficiency of a heater of this type is very high and the results obtained have been very satisfactory.

Connection of Water Heater to Boiler

273. Give a description, illustrated with outline sketches, of the connection of a circulating water heater to a vertical hot water boiler. Assume that the boiler is already connected to a coal range.

Ans. In connecting a circulating water heater to a vertical hot water boiler of the ordinary kitchen style, the bottom of the heater should be put about on a level with the bottom of the boiler in order to secure the best circulation. The cold water connection for the heater should be taken from the cold water pipe running from the bottom of the boiler to the water back of the coal range and the hot water pipe from the heater brought up and connected into the hot water supply pipe running out of the top of the boiler. This method of connecting, which should be followed even in the case of the water back of the coal range, compels all the cold water in the boiler to pass through the heater before any heated water can pass through a second time and enables the hot water to be drawn within a few minutes after lighting the gas in the heater instead of having to wait until all the water in the upper part of the boiler has been heated, as is necessary when the hot water pipe opens into the boiler at a point in the side about one-third of the height above the bottom, and will permit the securing of great economy in the use of gas, especially when small amounts of very hot water are required several times a day.

Stop cocks may be arranged, as shown, so that either the gas heater or the water back of the coal range can be shut off without interfering with the use of the other, but they are liable to cause serious trouble if they are closed accidentally and the water is started while they are closed, and for this reason it is better to have the connections made without any stop cocks.

In the cut the gas water heater has, for the sake of clearness, been shown as placed on the opposite side of the boiler from the coal range, but the connections can be made equally well with the heater in any position, and to save space it is often desirable to place it in front of the boiler on the side toward the coal range. When this is done it may

(Fifty-first Installment Next Week)

PRODUCTION OF GAS IN THE GENERATOR

(Continued from page 1286)

flat iron rods which were arranged at an inclination, making an angle of about 60 degrees with the horizontal. The water basin, which is located underneath the grate, is for the purpose of holding cooling water whose height is always maintained at a constant level by means of a proper overflow pipe. The space which remains open underneath the grate and which is 25 centimeters high serves for the removal of the clinkers, while the space above the

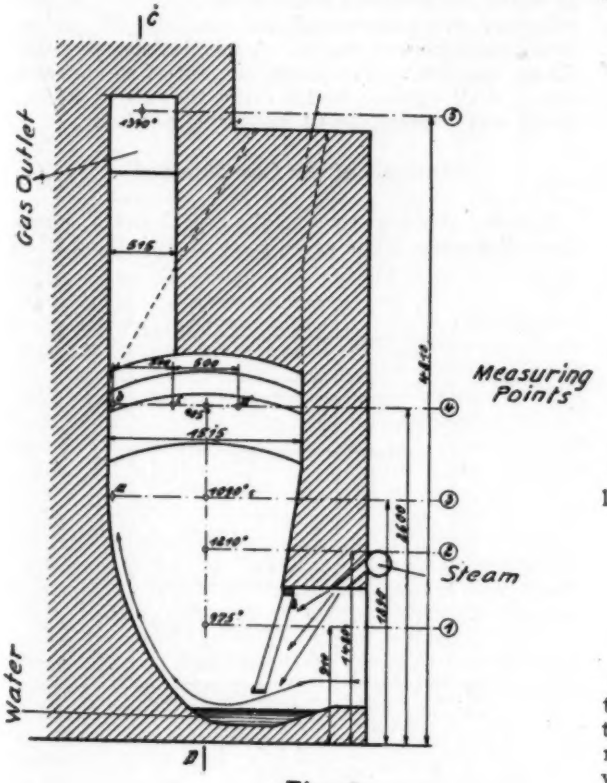


Fig. 3

Inclined Grate Producer

grate is for the purpose of holding an auxiliary grate, and during the operation of the apparatus this is filled up with stone and cement.

The total free grate area is 0.221 square meter and the ratio of the free grate area to the total grate area is 1 to 0.214.

The rear wall of the generator is built in such a fashion that the clinker formed during the operation of the machine can slide down into the water pit underneath the grate. This facilitates the removal of the ash and clinker. Air and steam are blown into the apparatus through the inlet shown in the figure. The dimensions of the apparatus correspond to those of the straight grate producer. The height is 1.515 meters, the width 1.15 meters. The gas produced in the machine is removed through a canal that is built into the center of the apparatus.

The points at which the tests were made in the bed of coal in the apparatus were located at the following heights above the bottom: 0.91, 1.48, 1.89, 2.6 and 4.81 meters. At the point 2.6 meters above the bottom of the generator fresh coke is found.

Carrying Out the Experiments

The following measurements were made during the course of the experiments:

1. The size of the coke and its composition.
2. The weight and composition of the residue.
3. The composition of the gas produced—carbon monoxide, carbon dioxide, hydrogen, methane, water vapor, oxygen and nitrogen, the sum equalling 100 per cent. These were determined for the five different points in the apparatus at which samples of the gas were taken.
4. The temperatures at these different points.
5. The static pressures in the generators at these five points.
6. The static pressure in the gases at the outlet of the recuperator.
7. The temperature of the cooling water from the gas outlet pipe.
8. The temperature of the air in the retort furnace.
9. The height of the barometer.

From these factors it was then possible to calculate the following:

10. The amount of air used.
11. The amount of steam used.
12. The amount of gas produced.

Apparatus Used.

The coke was weighed, a container being found to hold a certain weight of the fuel, and this being taken as a unit weight in filling the generator. The residual matter obtained in the machine was also weighed on a platform scale.

In each test samples of approximately 100 kilograms in weight were taken in the analysis of the coke and the ash. From these large samples smaller ones were taken and kept in glass-stoppered flasks until ready for analysis.

In taking samples of the gas produced in the different layers of the fuel bed in the apparatus, wrought iron tubes, provided with inner porcelain tubes, were employed. It was found, however, that it did not take more than 15 to 20 minutes for the cast iron casing of the sampler to be completely burnt out and then the porcelain tube was found to close up, so that a sample of gas could no longer be drawn through it. For this reason there was invented a water-cooled sampling tube.

The entire apparatus that was used in taking these samples and in making the analyses of the gas samples is shown in figure 4. As is seen therefrom, the samples of gas were sucked out of the apparatus

by means of suction bottles. The rate at which the samples of gas were removed was such that from one to two litres of water flowed out of the suction bottles within a period of one to one and one-half hours. The samples that are taken in this manner were representative in every sense of the word.

Analysis of the Gas

The percentages of water vapor and carbon dioxide were directly determined by means of absorption in calcium chloride tubes and potash bottles. The calcium chloride tubes were saturated with carbon dioxide before they were used in the experiments; the potash bulbs were filled, after each use of the bulbs, with fresh potash solution containing 25 per cent of the alkali. The glass parts of the testing apparatus were supported on wooden boards, which reduced the risk of their breaking. In weighing the different absorption tubes, which was done in the regular gas works laboratory, care was taken to see that the temperature remained constant while the weighing was going on. The tube connections that are shown in figure 4 facilitate the manipulation of the apparatus and make it very handy to use the apparatus, while at the same time securing good results. Before using the apparatus it is necessary to see that all air is removed from it.

The gas is drawn from the flasks for further analysis to determine the percentages of carbon monoxide, hydrogen and methane and oxygen. These analyses are made in the works laboratory in the regular way the next day. Hydrogen and methane are determined by combustion over platinum wire. However, this method does not allow the determination of percentages of methane of less than 0.3 per cent. The percentage of methane in these tests did not fall below this limit.

Temperature in the Generator

The temperatures in the different sections of the bed of fuel in the generator were determined by the aid of a pyrometer containing a platinum and a platinum-rhodium element. This pyrometer was built into the generator at the point corresponding to position 5 and hence it was not possible to determine the temperatures at all five points. Another difficulty encountered in recording the temperature was that the range of the millimeter voltmeter was not greater than 1100 degrees C. The temperatures were accordingly measured by means of an aspirating thermo-element wherein water was heated up by the heat contained in the gases drawn from the generators and the temperatures determined from the rise in temperature of the cooling water.

The static pressures within the apparatus were determined by means of a U tube. The amount of steam fed to the producer was measured with the aid of a steam meter, which was built into the line that fed steam into the producer. It was found, however, that, due to the considerable variation in the steam pressure, it was necessary to read the meter every five minutes. This was so troublesome that after the first test the mensuration of the steam was abandoned.

Results of the Experiments

A number of preliminary tests were first made to establish the proper conditions under which the experiments should be carried out. The two first tests with the flat grate generator were carried out with the suction in the retort furnace at nine millimeters of water. The coke consumption amounted to 3190 kilograms in 48 hours, and the weight of the residue was a thousand kilograms. A calculation was made, taking into consideration the amount of combustible matter in the residue, to determine the rate of coking, which was found to be 61 kilograms per hour.

Analysis of the Gas Obtained

Samples of the gas were taken at 11 and 32 hours after clinkering. The gases were analyzed and from

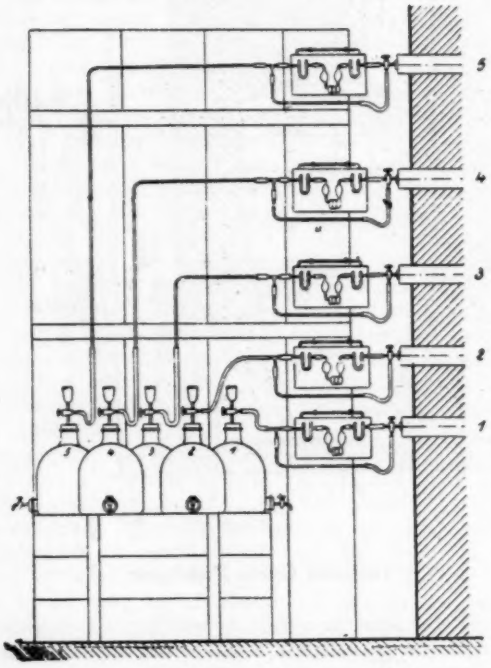


Fig. 4

The Set-Up for Taking Gas Samples

the results of the analysis of the samples of gas taken at different points in the generator, it was seen in both cases that there was one zone which was best suited for the reduction of carbon dioxide and water vapor. In the first test this was found to be in the third zone and in the second test in the fourth zone. Another lesson that was learned from the two ex-

periments performed above was that the only time at which an equitable comparison of the operation of the generator and the composition of the gases produced could be made was when conditions in the apparatus were constant.

Further tests were also made, samples of gas being taken at the five points indicated above at different time intervals after clinkering of the fuel. These were made for the purpose of determining what influence the time of clinkering had on the composition of the gases obtained in the different zones of the fuel. (The results are given in a series of tabulations in the original article, which cannot be reproduced here for want of space.—Editor.)

Discussion of Results

It was found that after a certain period of time up to a maximum of ten hours had elapsed after clinkering, the percentage of carbon monoxide preponderated in the lower zones, while at 28 hours and more after clinkering the carbon dioxide content reached an equilibrium.

To explain this phenomenon it is to be remembered that the first zone is 160 millimeters above the grate. As long as there is sufficient unburnt coke present in this layer, the carbon dioxide gas, which is first formed, will have a chance of being reduced to carbon monoxide. But as the time of gasification increases, the percentage of unburnt coke becomes less.

The same consideration holds good for the decomposition of the water vapor. In other words, it may be said that the best zone, that is, the zone that is best suited for the reduction of carbon dioxide and water vapor, varies in accordance with the increasing clinkering of the coke and gradually rises in the coke bed. One important fact was also deduced, namely, that is, the first ten hours after gasification starts in the generator the conditions remain constant and any changes that do take place within this period of time play an unimportant role in the gasification process.

Experiments With Different Air Pressures

The first practical matter to be tested out was the effect of the suction of the retort furnaces on the operator of the generator. In order to determine this factor, tests were made with different drafts. The normal draft was nine millimeters of water. In the tests the draft was raised to 11, 12.5 and 18.5 millimeters of water, whereas the steam pressure under the grate was maintained at 0.70 to 0.75 atmospheres. The time of the test was so chosen that the generator always remained in approximately the same operating conditions.

The results that were obtained in this series of experiments showed that a variation in the suction induced by the retort furnace to which the generator is connected did not have a very marked effect on the composition of the gas. In this case, as well as in the case where the draft was maintained at the normal nine millimeters of water, it was observed that the best zones for the reduction of carbon dioxide to carbon monoxide was the second or third zones, while the fourth zone was the one that gave a gas which contained the largest percentage of undecomposed water vapor.

The following tabulation is a composite table of the various results that were obtained in the experiments to determine the effect of the variation of the draft on the composition of the gas and the quantity of gas produced:

Test No.	Draft in millimeters water	Steam pressure atmospheres	Water vapor kg. per kg. coke	Quantity of gas cu. meters per hr.	Quantity of coke kg. 1 hr.
3	9.0	0.700	0.346	315	72.2
4	9.0	0.70	0.389	306	72.2
5	9.0	0.70	0.353	319	72.2
9	11.0	0.70	0.400	414	95
10	12.5	0.75	0.323	444	97.4
11	12.5	0.75	0.347	494	97.4
12	12.5	0.75	0.326	450	97.4
13	18.5	0.70	0.404	459	100
14	18.5	0.70	0.463	448	100

Discussion of the Table

It is evident from the aforegoing tabulation that the production of the generator, which, in other words, means the amount of coke that is gasified per hour and the amount of gas that is produced from this coke in the same period of time, increases as the air draft increases, but not in the same ratio. In the first place, when the draft is raised from zero to 12.5 millimeters of water, the throughput increases from 72.2 to 97.4 kilograms of coke. Then when the draft is further increased up to a maximum of 18.5 millimeters of water, the throughput of coke increases only about three kilograms per hour.

This phenomenon clearly shows that in the lower part of the generator a considerable resistance must be overcome. Hence, it would be advisable to overcome this resistance, not by increasing the draft, but by the simultaneous increase of the pressure of the steam that is blown into the generator under the grate. It is evident that under these conditions an increase in the steam pressure would in itself result in an increase in the capacity of the generator.

Experiments With Increased Steam Pressure

Hence a series of experiments were instituted to determine just what effect was produced by increasing the steam pressure. This series of tests was carried out under the same conditions as the ones that have been described above. The draft in the generator, induced by the retort furnace, was maintained at the normal point, nine millimeters of water.

The steam that is blown into the generator carries along with it a certain amount of air. During the test it was found that the proportion of steam blown into the apparatus to the air, that is sucked in along

with it, remained constant. Hence, the ratio of the added steam to the gasified coke was not changed.

These tests were made in a similar manner to those described above and a great amount of data was collected during the experiments. Samples of gas were collected at different zones and analyzed, while all other factors were measured with great accuracy.

Discussion of Results

As far as the composition of the gas produced is concerned, the same considerations hold good as have been described above. The zones which were richest in carbon monoxides were the second and the third, while the fourth and the fifth likewise showed the greatest proportion of water vapor.

On the other hand, it was clearly seen that the increase in the steam pressure had quite an important effect on the pressure relations that existed in the apparatus. While, when the generator was operated at lower pressures of steam, an increasing vacuum existed from the bottom to the top of the apparatus, when it is operated at higher steam pressures there is found a slight positive pressure in the lower zones of the fuel bed. This pressure increases as the pressure of the steam increases.

The following tabulation is a composite of the results that were obtained in this test, which was made for the purpose of determining the effects produced by the increase in the steam pressure on the amount of moisture added, the amount of air sucked in along with the steam and the production and throughout of the apparatus under these conditions:

Tests No.	Steam pressure atmospheres	Air sucked in cubic meters per hr.	Quantity of steam kg. per kg. coke	Quantity of gas cubic meters per hr.	Gasified coke kg. hr.
15	0.35	176	0.343	266	61.0
16	0.70	192	0.346	315	72.2
17	1.3	362	0.257	370	112.2
18	1.3	328	0.317	453	112.2

What the Figures Show

The figures in the tabulation above show that the load on the generator is much lighter when the pressure of the steam is increased than when the draft produced by the retort furnaces is increased. In general, of course, it is true that the output of the generators can be just as easily increased by raising the draft pressure as it can by increasing the pressure of steam blown into the apparatus. For when one and the same fuel is being used in the apparatus only the difference between the static pressure in the gas outlet pipe, from minus four to minus six millimeters of water, and under the grate from plus fifteen to plus thirty millimeters of water, are of any account in determining the coke throughput of the apparatus, but not just one or the other of these factors. Hence, it follows that it is entirely of no moment just how this difference in pressures is attained.

In the case in question, however, an increase in the suction effect in the gas outlet pipe is somewhat more difficult to obtain than an increase in the pressure that exists under the grate, as when the draft induced by the retort furnaces through the heat recuperators is increased a considerable loss of suction is suffered through the entire furnace system up to the gas outlet from the generator.

It is, however, unfortunate that the increase in the coke throughput of the generator cannot be indefinitely increased by raising the pressure of steam blown into the apparatus, as the removal of the clinker is a determinant factor in this respect. In tests 17 and 18, as above, with a coke throughput of 112 kilograms per hour, the addition of steam must be shut off almost entirely for a period of 48 hours, for otherwise the amount of clinker produced will be increased to such a point that the entire generator will have to be emptied in order to remove it.

Importance of Formation of Clinker

From this it may be seen that the throughput of the generator is limited greatly by the formation of clinker. For this reason the throughput indicated in tests 13 and 14 with a coke consumption of 100 kilograms per hour, or 58 kilograms per square meter, must be considered as being a maximum when the clinker is removed every 48 hours. In this case the removal of the clinker entails no difficulty.

As far as the most favorable condition for the addition of steam is concerned, the experiments which have just been described yield no conclusive results. In these tests the amount of steam that was blown into the apparatus per kilogram of coke that was processed in it remained practically the same throughout all the experiments. This was maintained in such a state in spite of the considerable variations that took place in the draft and in the steam pressure.

(The article is still to be finished in the German, but what has been abstracted here is seen to be of considerable value as an original search. This matter of control of generator operations is an important one and the above study will interest those who are directly concerned with generator operation. In the original article there are a number of comprehensive tabulations which have been abstracted in the translation.—Trans.)

PAPER THERMOMETERS FOR THE GAS OVEN

An ordinary piece of white paper will do the work of an elaborate oven thermometer in cooking with gas, if it is properly used. In order to determine the correct degree of heat required by different baking operations, place a sheet of paper in the oven and leave it there with the doors closed and the heat on for a period of five minutes. If the paper is a light yellow, then the oven is just the right temperature for a sponge or pound cake. For all other kinds of cut cakes the paper should turn a dark yellow, and for bread and pastry it should be a rich dark brown. Be careful not to leave the paper longer than the required five minutes.

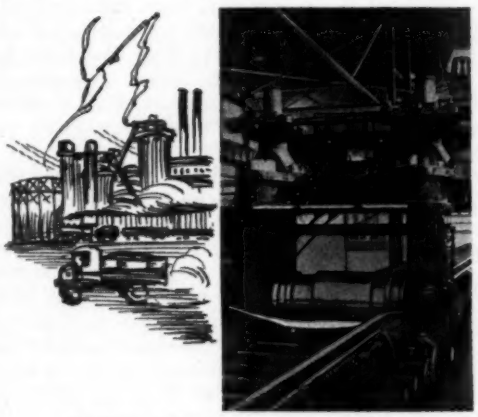
FROM THE ORE FIELDS TO THE FINISHED PRODUCT

(Continued from page 1290)

a little less than three hours to unload. The trip is made in a few days. The route is well charted and seldom is an ore boat out of sight of another during the open navigation season.

Smelting

Iron ore, the raw material of the blast furnace, is an oxide of iron usually more or less contaminated by various impurities, and it is the function of the blast furnace to remove the oxygen from the iron and to slag-off impurities. Carbon in the form of coke is the usual deoxidizing agent and its combus-



Rolling Mill Turning Out Sheets

tion also furnishes the heat necessary to melt the resulting iron and slag. Limestone is added as a flux to reduce the slag more easily fusible. It should be understood that the furnace is always kept filled with these materials. As the coke, ore and limestone are burned and melted away in the hearth, the column above settles and fresh quantities are charged into the top to maintain the supply. As the molten iron and slag run down into the hearth, they separate, owing to the difference in their weights, the lighter slag flats on the heavier iron. Two tap holes are provided at different levels. From the lower the iron runs into a series of channels which guide into either pig beds or a receiving ladle, while from the upper tap hole the slag is tapped into a slag laddle or into a tank of water known as a granulating pit. The slag, later on, is made into cement.

Gas Is Used

The gases resulting from the combustion of the coke are partially combustible and have a considerable fuel value. Therefore, they are drawn off from the top of the furnace and burned under boilers to raise steam or in hot blast stoves to heat the ingoing air blasts into the blast furnaces. Owing to this use it is seldom necessary to use any large amount of coal at a modern furnace plant.

Steel for the World

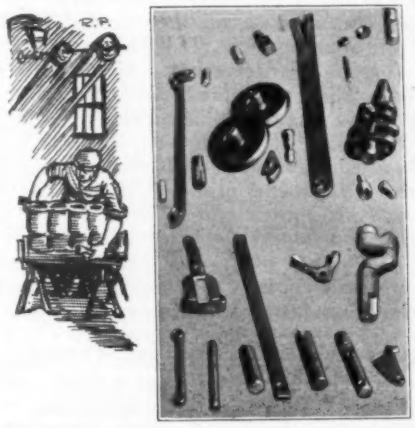
The quantity of materials handled at a modern blast furnace is very impressive. Such a plant will have to be fed every 24 hours with some 800 tons of ore, 400 tons of coke and 100 tons of limestone or a total of 1300 tons or 2,600,000 lbs. of solid materials. It is interesting to note that 2,500 tons of air are required. Four hundred tons of pig iron will be produced. Pig iron in the United States amounts to 40,000,000 tons annually.

Steel Is Made in the Open-Hearth

Pig iron, of course, is an alloy of metallic iron with varying percentages of other elements, of which the most important are carbon, silicon, manganese, sulphur and phosphorus. Pig iron generally contains 3½ to 4½ per cent carbon. To make steel the problem is to convert this cheap, but impure, metal to iron containing say 0.10 per cent each of carbon, silicon and manganese, and to do it at a small expense.

Great Care Exercised in Open-Hearth

The function of the open-hearth is to burn out the impurities in the iron, and add other characteristic producing ingredients. As soon as the heaped-up pile of pig-iron in the open-hearth furnace begins to drip and run, assuming a molten state, the vigilance of the first helper is intensified. Repeated tests are taken while the melt is in progress. Test boys rush to the laboratories with pieces of the metal which have been cooled just enough to be transported. The results of these tests are sent back to the furnace men, who govern the treatment



Small Steel Parts Ready for Assembling

of the charge accordingly, bringing the final analysis at the time of tanning the heat within the final analysis desired. The addition of the purifying agents at the time of pouring the molten metal into

the molds removes any gases and impurities which may remain.

The Path Divides

From this point on it would be a laborious task to trace the many paths steel takes until it reaches its ultimate use. And then, too, the story would not be complete. Millions of tons of scrap iron and steel are remelted every year into new shapes. The railroads are probably the largest single users of iron and steel. They require 15 per cent of all the iron and steel produced in this country for their cars and locomotives and 14 per cent for tracks and right-of-way equipment.

The Rolling Mill

From the open-hearth a great deal of steel in the form of ingots, blooms and billets goes to the rolling mill, where it is heated in gas-fired soaking pits to a very high temperature and then rolled between enormous steel rolls to the desired shape. Railroad track, structural shapes, sheets, bars, pipe and wire are a few of the many products of the rolling mill.

Gas-Fired Steel Melting Furnace

Considerable steel is melted in furnaces much like the open-hearth. In general practice scrap is always included in the melt in these steel melting furnaces. One of the most interesting and recent experiments in the gas industry is the gas-fired steel melting furnace. Oxygen is added to the air blast. The flame is directed toward the pile of steel ingots and scrap iron. It quickly melts. The products of combustion rise to a hot blast stove overhead that pre-heats the new air going into the blast. The cost of melting steel in this manner is estimated at about $6 per ton. This new furnace is receiving much attention from the U. S. Bureau of Mines and represents an enormous potential market for industrial gas when further developed.

Gas Everywhere You Look

In every part of the story of the manufacture of steel or its products gas plays a vital part. It is used in the blast furnaces, in the open-hearth, in the crucibles, in the soaking pits. It is used for heat treating, for forging, for riveting and a multitude of other uses. The metal trades manufacturers used over one and a quarter billion cubic feet of gas in Chicago last year. The "big" use for gas in industrial fields is wherever iron and steel is being shaped. The value of the metal products turned out in Chicago annually is approximately three billion dollars. Many of these products are made with the use of industrial gas. Gas plays an important part in everything made of iron or steel from the time it reaches the blast furnace until it reaches you.

SWEETENING SOUR EMPLOYEES

(Continued from page 1284)

Frank Discussion of the Grievance

If whoever has charge of putting promotions or increases in salary into effect would take some special thought for those who have earned, or think they have earned the right, but have not been elected for such consideration; and would discuss the matter freely with them, man to man—instead of allowing office gossip to get in its deadly work—much subsequent sourness would be prevented. For the most part men are reasonable, even when disappointed, and what most of them crave is some sign of appreciation. Of course, appreciation is best expressed in the pay envelope, but between men who trust in each other there are other ways. A belif in fair play is part of the religion of all worthwhile men—and if you can convince your man that as far as you are able you are treating him fairly, you will make a new friend or save an old one.

It means all the difference between having your people work for you, or work with you. A man who thinks he has been cheated generally manages sooner or later to cheat his employers, though they will probably never suspect it.

An Apparently Great Task

It looks like a lot of work to consider the feelings of a number of people who may regard themselves as being slighted or overlooked in some changes of positions or grading of salaries. The persons responsible for these changes may be perfectly justified in feeling that they are all equitable and fair, always considering the ultimate good of the business. But if they want to keep their organization "sweet" and free from office politics, they should make some effort and take considerable pains to "sell" their choice and decision to all whom it may affect.

Do not overlook the fact that the fine, dependable, old plodder, of whose work the head of the department is secretly proud, may have a silent but deep-seated grievance. He may be at heart the sourest man in the office. One sour employee in the course of a few years can offset many thousand dollars spent in good-will advertising. But sourness only thrives in groups. A man who knocks the organization only gets sympathy from other knockers, and without someone to talk to he loses his voice.
their point of view, even if it impinges on your own probity and avowed desire of giving every man, as nearly as possible, a square deal.

There is no more certain way of poisoning our peace of mind than by encouraging the habit of comparing our own lot with that of some one whom we think is more fortunate, better paid or more appreciated than we are ourselves.

The resulting aggravation and anxiety is enhanced if the person with whom we are comparing ourselves is close to us in a business or social way.

If not carried to excess, the exercise of this instinct may have some value in helping us to keep in step with our neighbors. Insofar as it prevents us from falling behind the procession, or serves to stimulate our efforts to improve our position by improving ourselves, it operates to our own and the general good.

The Value of Discontent

It is a condition of mind that is probably common to all mankind at some time or other. Discontent is of Divine origin; without it there would be no progress. Discontent is a deadly disease if we take it "lying down"—but taken in homeopathic doses, followed by a good draught of healthy exercise, it is stimulating and braces our nerves and sinews to action, encourages us to attempt and accomplish things which, lacking this stimulant, we might allow to melt away in dreams.

Get hold of your disappointed, discontented men, and show them how to turn their discontent to their own profit. Push on—Achieve.

Current Market Prices

COALS (By Courtesy of Coal Age)
A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.10 to 2.50
Kanawha mine run	Columbus	1.45 to 1.65
West Virginia lump	Cincinnati	1.90 to 2.50
W. Virginia gas mine run	Cincinnati	1.40 to 1.65
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.50 to 3.25
Big Seam mine run	Birmingham	1.50 to 1.75
Southeast Kentucky lump	Louisville	2.50 to 2.75
Southeast Kentucky mine run	Louisville	1.35 to 1.50

B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

	Market	Freight rates	Independent	Company
Egg	New York	$3.34	$8.25 to $8.75	$8.75 to $9.25
Egg	Philadelphia	2.39	9.45 to 9.75	8.80 to 9.25
Egg	Chicago (net tons)	5.06	8.17 to 8.40	8.08 to 8.20

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.25 to $4.00
Wise County, furnace	3.75 to 4.00
Alabama, furnace	4.25 to 4.50
Foundry, Newark, N. J., del.	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	11.00
Foundry, Granite City, Ill.	9.00
Foundry, Alabama	4.50 to 5.00

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.50
Lima	1.55
Pennsylvania	$2.75 to 2.85
Wooster, Ohio	1.40
Indiana—Illinois.	
Illinois	1.37
Indiana	1.38
Oklahoma—Kansas.	
Mid-continent (low gravity)	.75
Gulf Coast.	
Gulf Coast, Grade A	$1.50
Gulf Coast, Grade B	1.25

GAS OILS.

Gas Oil, Bayonne, bulk gal.	5¼c
Gas Oil (32-36) Oklahoma, gal.	3⅛ to 3¼c
Gas Oil (32-36) Gulf Coast, gal	3¾ to 4 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$56.20 to $57.20
Six-inch and over, Chicago	52.20 to 53.20
Four-inch, Birmingham	49.00 to 50.00
Six-inch and over, Birmingham	45.00 to 46.00
Four-inch, New York	65.50 to 66.50
Six-inch and over, New York	60.50 to 61.50
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb.	5 to 5¼c
Ammonia aqua, 20 deg. drums lb.	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb.	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk F. O B. Works, per 100 lbs.	$2.70 to $2.80
Potash prussiate, yellow casks, lb.	16½ to 16¾c
Potash prussiate, red casks, lb	37 to 38 c
Soda prussiate, yellow casks,	9¼ to 9½c
Soda sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

Benzol C. P. tanks, works, gal.	24 to 25c
Benzol, drums, gal.	30c
Benzol, 90% tanks, works, gal.	23c
Benzol, 90% drums, gal.	28c
Napthalene, flake, barrels, lb.	5½ to 6 c
Napthalene, dyestuff bags, lb.	5 to 5½c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal.	29 to 30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal.	36c

Coal

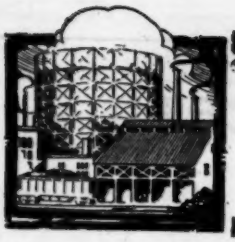
Bituminous coal production advanced substantially during the week ended December 6, when, according to the Geological Survey, 10,612,000 net tons were produced. This was an increase of 972,000 tons—as shown by revised figures—over the preceding week, when operations were curtailed by the observance of Thanksgiving Day. Incidentally this was the fourth consecutive week in which output exceeded that of the corresponding week of last year. Anthracite output also turned upward after the holiday, the total for the week ended December 6 being 1,814 net tons, compared with 1,611,000 tons during the previous week and 1,837,000 tons in the corresponding week of 1923.

Crude Oil

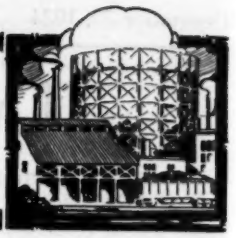
A slight decrease in daily average gross crude oil production was reported for the week ended December 6, the output dropping off 1,000 barrels daily. The American Petroleum Institute estimates that production for the week was 1,974,800 barrels, as compared with 1,975,000 barrels for the preceding week. The daily average production east of California was 1,376,300 barrels, as compared with 1,380,300 barrels, a decrease of 3,500 barrels.

Gas Oil

Gas oil was meeting with a better movement at 5¼c per gallon.



NEWS OF THE GAS INDUSTRY



Sell with a Smile!

Sales talk with a punch given to members of the Gas Sales Asso. of New England

Comparing the sales methods used by the Fuller Brush Company with that of the gas companies and gas appliance manufacturers, Mr. E. H. Kauffman, educational director of the Fuller Brush Company, addressed 175 members of the Gas Sales Association at their regular monthly meeting, held in Boston, December 12, 1924.

The speaker of the evening outlined in detail the policies of his organization and the methods employed whereby sales had increased from $129,000 in 1912 to over $15,000,000 in 1924, all sales being made direct to the consumer.

Mr. Kauffman's talk was one of the most educational and interesting that the members of the association have been privileged to listen to. His address contained many new sales ideas and suggestions, which if put into effect will increase the sale of gas appliances throughout the country.

Mr. Kauffman said in part:

"You men are to be congratulated on being associated with the Gas Sales Association of New England. It was my privilege last August to speak before the first sales conference of the American Gas Association, which was held in Millbrook, New York.

"While there I observed that the manufactured gas industry holds the distinction of being one of the oldest public service industries of today and ranks among the most progressive.

"As an industry, I firmly believe that the gas industry holds one of the biggest opportunities for future development of sales and service that exists in our country today.

Selling the Customer Direct

"The subject assigned me, 'Selling the Customer Direct,' is a very interesting one. You men are to be congratulated on being engaged in one of the oldest and yet one of the newest methods of merchandising—that of selling the customer direct.

"Selling the customer direct was probably the first stage in the development of the modern process of selling. It was closely followed by the retailer and later by the wholesaler and jobber. Each of these methods of distribution are very essential to modern life. Each one has its own particular advantages.

Methods and Service

"Such organizations as the Gas Sales Association and the Fuller Brush Company have recognized the value of the possibilities that exist in selling the customer direct. Consequently your organization and my organization have formulated definite ideals of service, and definite methods, which inspire courtesy and confidence, and which overcome the so-called disadvantages of direct selling.

"You will recognize a few of these:

"1. The old, dirty, unscrupulous peddler has been replaced by a well-trained, closely supervised, courteous gentleman.

"2. The inferior products have been replaced by products of standard quality and nation-wide reputation.

"3. The customer is given the opportunity of comparing values and there is one price to all.

"4. The personal reputation of the salesman and the national reputation of the company have become a guarantee of service and satisfaction.

"It is these principles which have made your organization the success that it is, and it is these principles which have been responsible for the success of the Fuller Brush Company in selling direct to the customer.

Supervision Important

"Up to the present time close supervision has been the first and most important point in the development of our sales organization.

"Every eight salesmen have a supervisor known as an assistant branch manager, while each salesman under his supervision has control of 2,000 families which he serves regularly three times each year. The assistant branch manager is responsible for the service which is given to 16,000 families, or 80,000 population.

"From four to eight assistant managers are supervised by a branch manager, who serves a population of from 350,000 to 500,000. We have 220 such branches throughout the organization.

"From six to eight branches are supervised by a district manager, and each district has a population of from two and one-half to four million population. We have twenty-seven districts in our organization.

"These twenty-seven districts are supervised by six division managers. Three of these division managers are located in Hartford, one in Toronto, Ontario, one in Oakland, California, and one in Birmingham, Alabama.

"The work of the division is supervised by the director of sales and two sales managers. One of the sales managers is in charge of sales promotion and the other is the executive manager and secretary of the company, in charge of the development of the product.

"When you consider that the success of selling the customer di-

rect depends entirely upon close supervision of each representative in the field, then you will probably realize the value of Mr. Fuller's statement that the one biggest factor in the development of our business has been men, and the service they have given to the public.

Average Man

"In the American Magazine of November, 1921, Mr. Fuller told the story of the development of our business. He said that he was only an average man surrounded by average men. Mr. Fuller gives each one of his assistants responsibility and it is responsibility that either makes men grow or breaks them. The training of these executives has been a very important factor in the development of our business.

"We give two kinds of training to our executives—first, that which comes from responsibility; second, that which comes from special training.

Advertising

"The second biggest factor in the development of the Fuller Brush Company has been advertising. Our advertising program has grown from a few lines in The Ladies Home Journal in 1914 to the large two-page color spreads which are now seen from time to time.

Object of Advertising

"The object behind our advertising has never been to sell Fuller brushes. The advertising has, however, been very effective in selling to the consuming public the fact.

"First, the Fuller man can be welcomed to their homes.

"Second, the Fuller Brush Company is reliable.

"Third, the Fuller product is a quality product.

"Fourth, the method of selling direct brings a high type of personal service.

"We have selected a certain group of national magazines which are very high in reputation. It might be interesting to note that every one of these magazines had to be sold on the fact that our products should be advertised on their pages. When we proved to them that we had a company which gives a definite service to the customer, they were glad to give us the opportunity of advertising in their pages.

Carry the Store to the Home

"The third most important factor which has contributed to our success is the method of selling. Statistics show that 90 per cent of the equipment of the home is bought by the women, and I think we who are married know that our wives can at times be prolific spenders of our money.

"In our work we do not think of the direct method of selling as house-to-house work. We think of it in entirely different terms. We think of it as bringing our stores to the homes. We are carrying a service to the customer and we believe that a high value will be placed upon it when the customer realizes the service that we are giving.

Quality of Product

"The fourth reason for the success of our company has been the quality of the product. Mr. Fuller has always insisted that the quality of product which bears his name should be the very highest. I have often heard him say, 'The manufacturer who produces a quality product is entitled to a profit for his work. The customer who buys the product is entitled to more than her money's worth—she is entitled to a profit.'"

Summary

In closing his talk, Mr. Kauffman stated that the following were the reasons why the Fuller Brush Company had made such a remarkable success in the direct method of selling:

"1. Because of the courteous, instructive call of our representative to the homes.

"2. Because of the quality products which are backed by the reputation of a nationally advertised concern.

"3. Because thousands of satisfied customers have boosted our line—for it has filled a definite need.

"4. Because the specialized tools which we have developed are serving a very useful place in over 15,000,000 homes in our country.

"5. Because our men are closely supervised and the company's ideals of service are ever set before them.

"The greatest reason," said Mr. Kauffman, "has been the inspiration and leadership of our president and founder, Mr. Alfred C. Fuller. Someone has said that the organization is but the lengthening shadow of its leader. If that is true, then all of the ideals which have made the Fuller Brush Company a success have been those ideals which pervade the life of our great leader.

"He has been the pioneer, he has had the foresight, the vision and the strength of character to build an organization of nearly 7,000 men who are welcomed into the homes of 15,000,000 families throughout this great country of ours.

"My last words to you men are, Invest a smile and you will usually get an order."

Mary E. Dillon Says Opportunity Knocks for Women, Too

There's no sex in brains or in ability. Opportunity knocks as often for women as for men—the only difference being that men interpret all the knocks for themselves, while women, bashfully and with false modesty, let opportunity slip by. Women take men's estimate of their ability and consequently get nowhere.

All this and more is what experience has taught Miss Mary E. Dillon, who recently was made general manager and vice-president of the Brooklyn Borough Gas Company, a $5,000,000 corporation, which supplies Brooklyn and Coney Island with its daily gas.

Miss Dillon didn't learn this over night. It came through twenty years' work, all with the same company, but in many different jobs, from clerk up. And so Miss Dillon adds to her general beliefs that "sticking in a rut," as staying with one concern is often called, isn't such a bad idea, after all.

Miss Mary E. Dillon

Being a vice-president of a public utility takes a variety of talent. One must be able to decide what should be done with stray cats, how long, or rather how short, Coney Island beauties can wear bathing suits and get away with it, the proper name for the policeman's newest baby and whether thirteen is an unlucky number for a dinner party—when the party is a family affair.

"What did you tell them?" she was asked.

"Oh, I say family dinner parties are risky enough; why flirt with danger?" she answered, with a laugh, and then added, seriously: "No, of course not that, but we do have to talk about everything but gas. I think this kind of public service is the most important function of a utility, and that is why I feel utility offers a splendid field for women. In business success lies in handling things like a man, and in handling people like a woman.

"Half the job here is handling people. We are a community center. We not only give free advice, but we conduct cooking classes, which is of very definite value, as it teaches women to use their ovens instead of the delicatessen, and that means business for us. In making a utility the town's best neighbor we are working for our own interests, too. I find that people who take your word about the proper way to raise a baby will believe what you say when the topic is gas."

Her new title, of which she is very proud, but not unduly so, as it is only an official recognition of the "job" she has held for the last five years, is not her only one. She is vice-president of the Baby Center, chairman of the annual dinner committee of the Chamber of Commerce, chairman of the women's division, Empire Gas and Electric Association, and editor of the Coney Island year book.

Pittsburg Salesmen Active in New England

The Pittsburg Water Heater Company has quite a sales organization in New England under the direction of Fred K. Wells Sales Company, New England distributor. These men are located in the larger cities of New England and are co-operating with the plumber and the gas company in selling Pittsburg water heaters to consumers.

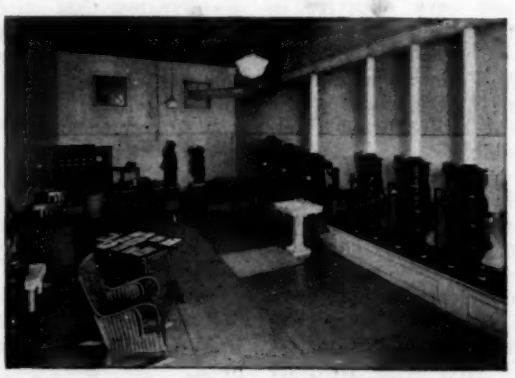
This live bunch of salesmen are turning tradition into truth. New England always has been looked upon as a good business section and despite the fact that the shoe and textile mills have not been operating as they should in the past year or year and a half, and the payrolls in these cities have been curtailed, these salesmen have been getting orders for the plumbers and the gas companies for Pittsburg water heaters right along, and at the last meeting every one of them expressed themselves that now that the factories are opening up and beginning to distribute a payroll, water heater business will be increased considerably.

The Pittsburg Water Heater Company has recently opened a direct factory branch office and display room in Los Angeles, Calif. This display room is located at 647 South Hope street, in the heart of the retail section of the city. It is in charge of Mr. J. L. Krah, who has represented the Pittsburg company in Los Angeles for some years through the company's former sales agency.

A complete stock of all sizes and types of Pittsburg water heaters as well as parts is maintained in Los Angeles for the convenience of the trade in Southern California.

Society of Gas Lighting Elects Officers

At the annual meeting of the Society of Gas Lighting, at the Hotel Astor, Thursday, December 11, the following were elected officers for the ensuing year: President, Charles H. Nettleton; vice-president, W. Cullen Morris; treasurer, William J. Welsh; secretary, Geo. G. Ramsdell; for member of the executive committee, Alfred E. Forstall; members of the finance committee, Edward C. Uhlig, R. W. Bush and W. F. Lawrence.



New Los Angeles Branch, Pittsburg Water Heater Co.